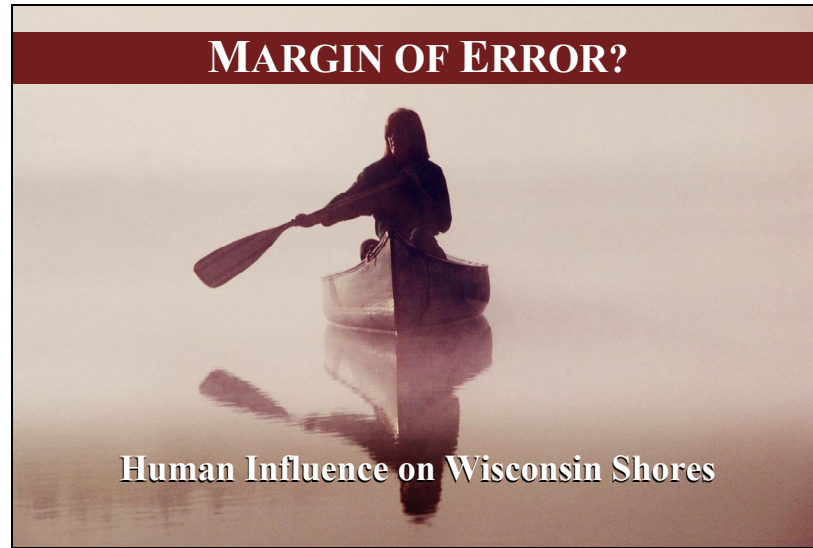


Slide 1

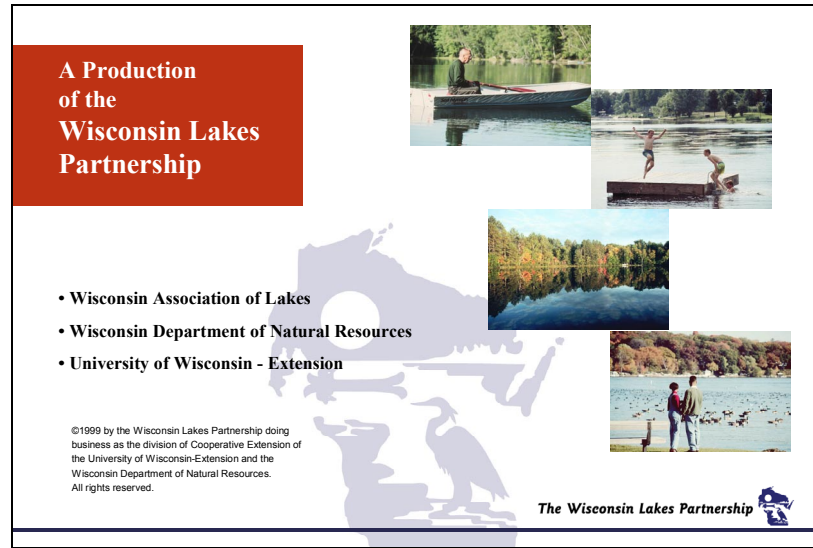


This program is a production of the Wisconsin Lakes Partnership. For information about the program or to obtain a copy contact: the University of Wisconsin Stevens Point, Extension Lakes Program at 715-346-2116 or e-mail bkorth@uwsp.edu or mail UWEX Lakes, University of Wisconsin Stevens Point, College of Natural Resource Building, 1900 Franklin, Stevens Point WI, 54481.

USING THE PROGRAM:

This program is designed to assist a speaker talking to an audience concerned with the impacts of human development on lake shores, shoreland zoning and lake classification. It can be used "as is" by a person with limited background on this issue. It should also be helpful to people with some special knowledge in this area. By having this script on disk you can easily customize it to fit your needs. You can add your own research, customize it to a special area, or change it to fit a particular audience, or your own special purpose. *Italicized* words are extra facts, references or suggestions and need not be part of the script. **Bolded** words describe what is depicted on the slide images.

Slide 2



A Production of the Wisconsin Lakes Partnership

- Wisconsin Association of Lakes
- Wisconsin Department of Natural Resources
- University of Wisconsin - Extension

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Funding: Wisconsin lakes Partnership & Upper Chippewa GMU

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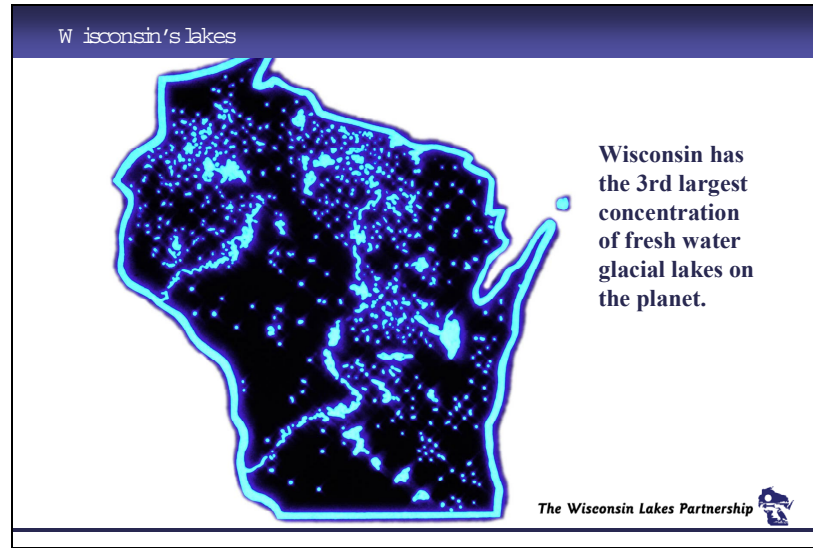
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Slide 3

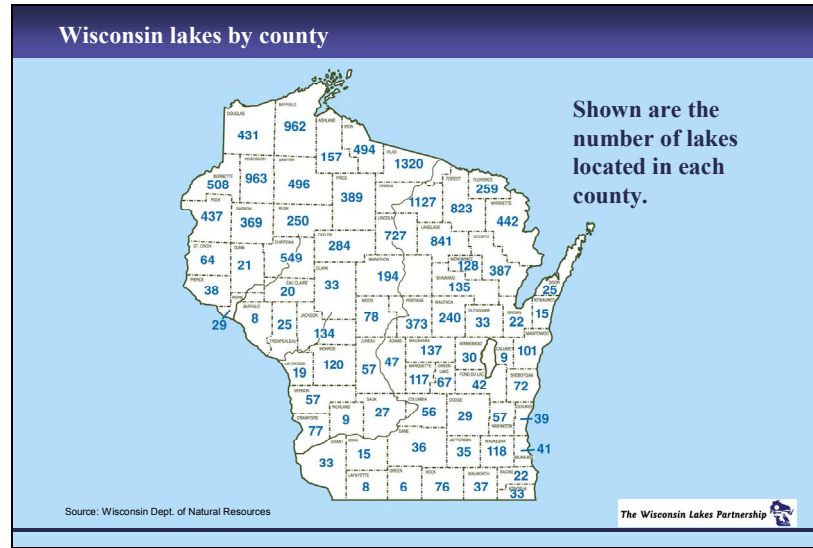


Slide 4



Wisconsin is blessed with the third largest concentration of fresh water glacial lakes on the planet. Only Ontario and Alaska have more. (WDNR)

Slide 5



This map gives you an idea of where our lakes are concentrated and how many are in each county. Wisconsin has about 15,000 miles of shore along its 15,000 lakes. (WDNR)

Slide 6



The margin of our waters is the place where all life comes together... a bridge between two worlds. It is a place essential for plants and creatures to survive. As many as 90% of the living things in our lakes and rivers are found along their shallow margins and shores.

(source: Rideau Canal, Parks Canada)

A wild shore shelters a uniquely rich and diverse habitat as well as the life that requires it.

Slide 7



Another motivation that brings folks near the water is harder to explain. For some reason most of us find some level of inner peace when we are near the water. Studies and surveys show overwhelmingly that for most of us, simply looking out across a body of water is enough to make us feel a sense of contentment.

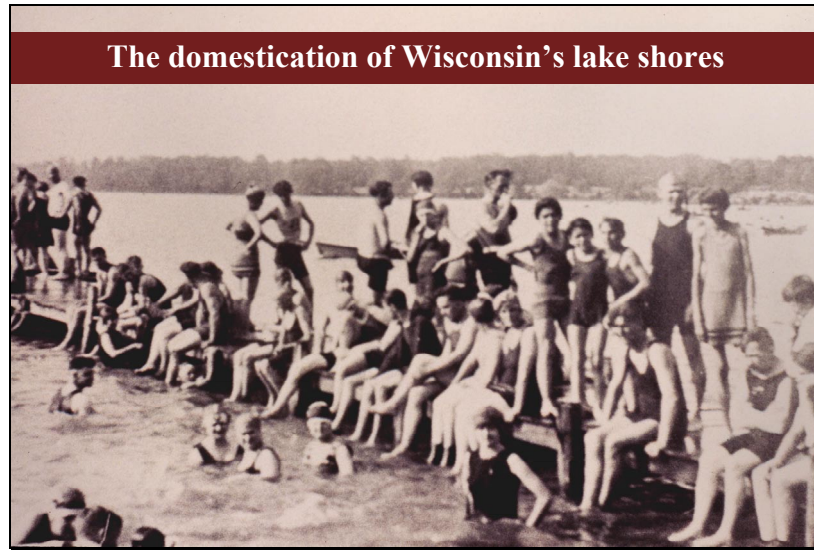
Wisconsin Dept. of Tourism and UWEX surveys suggest what most of us already know: that peace, a relaxed atmosphere, and natural beauty are the most important things we look for when we are near the water. In a 1993 survey of 2334 Lake Tides readers, 78% responded that natural beauty and peace and quiet were the main reason for enjoying lakes.

Slide 8



We feel good when we are near the water. It helps us to unwind. Think of dangling your feet in cool water on a hot, humid summer day. For some people, it is a perfect place to let it all hang out in exhilarating recreational pastimes like power boating or riding personal watercraft.

Slide 9



Slide 10



At the turn of the century the northern Wisconsin landscape was full of cut-over lands and failed farms. Failure to pay taxes and bankruptcy saw many lands revert ownership to banks and counties. Land was cheap. In 1915, 40 acres of land in Oneida County sold for \$80 or less; taxes on it ran about \$3.

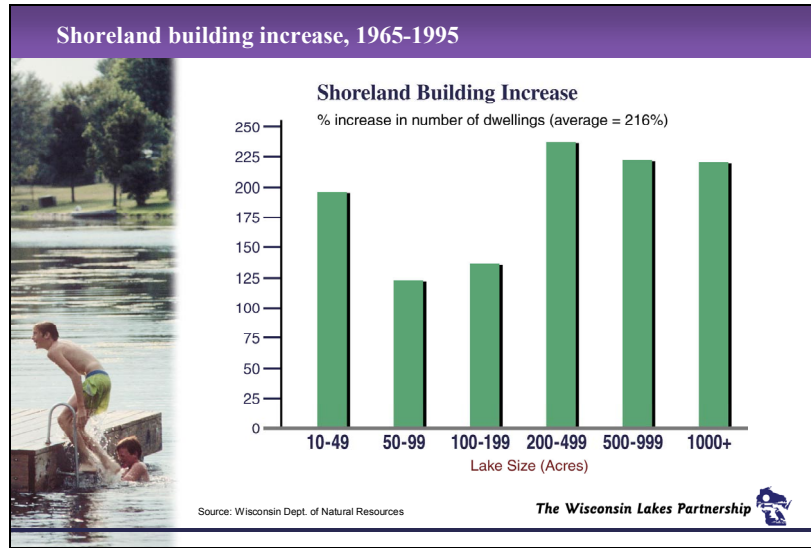
(Customize to your county, town or GMU with old pictures or with old and new plat book pictures.)

Slide 11



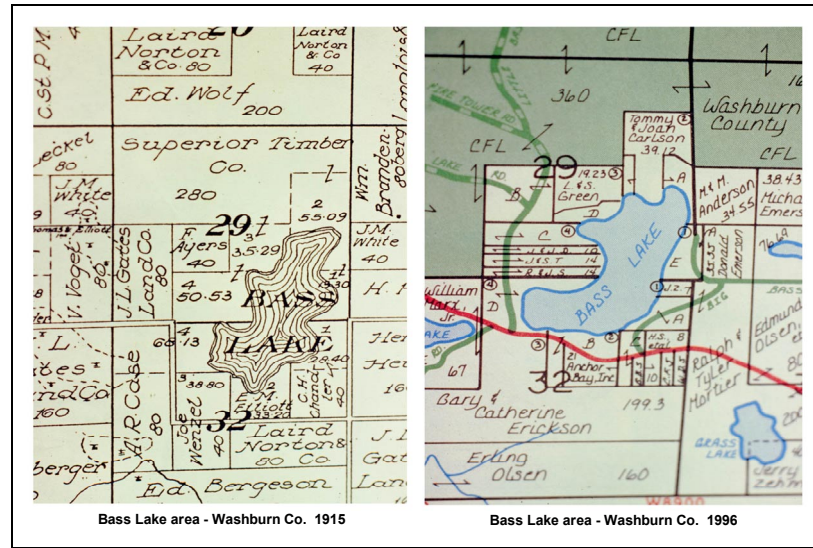
Prior to World War II natural shoreline was the norm on Wisconsin's lakes. Private homes were scarce, crowding meant seeing one other person on the lake, and oars powered boats. Traveling to the lake was an event. If folks were heading for the "North Woods" they may have traveled by train and stayed at one of the large lake resorts located on the best sites. If folks lived near the southern cities they may have left on weekends and for vacations to visit the local lakes. If there were homes on southern lakes they were mostly farms, small cabins and a few resorts.

Slide 12



World War II altered our nation forever. Our way of life started to change. We left the farms for the cities, we went to college, and the number of women working outside the home grew. The idea of each of us owning a little getaway on the water took root. We started to buy. **This Graph shows the increase in dwellings on lakes in northern Wisconsin. There has been an overall average increase of 216% on all lakes since 1965.** There was no distinct trend by lake size, which may indicate that all size lakes have an equal potential for development.

Slide 13



As the demand for lake frontage grew, large plots of land were subdivided. A person owning a “forty” on the water could turn a tidy profit by selling narrow slices of frontage. Parents often gave small pieces of land to family members. Notice the size of the parcels on Bass Lake in 1915 and again in 1996. Notice the trend to subdivide land into long narrow parcels. The reasons make economic sense. Splitting a large parcel into small parcels will make the owner more money per front foot, while keeping the price in a range that more people can afford.

There are other forces prompting the fragmentation of water frontage. As our nation has grown and prospered, so have the demands for waterfront property, pushing values upward with taxes increasing accordingly. Folks that bought lake frontage many years ago may find themselves needing to sell some of their land to pay their taxes. People may have unexpected emergencies and need to raise large amounts of money by selling property. Increasing demand makes waterfront property a good investment.

(Bass Lake, Washburn County data. You can customize this type of data to your county, town or GMU)

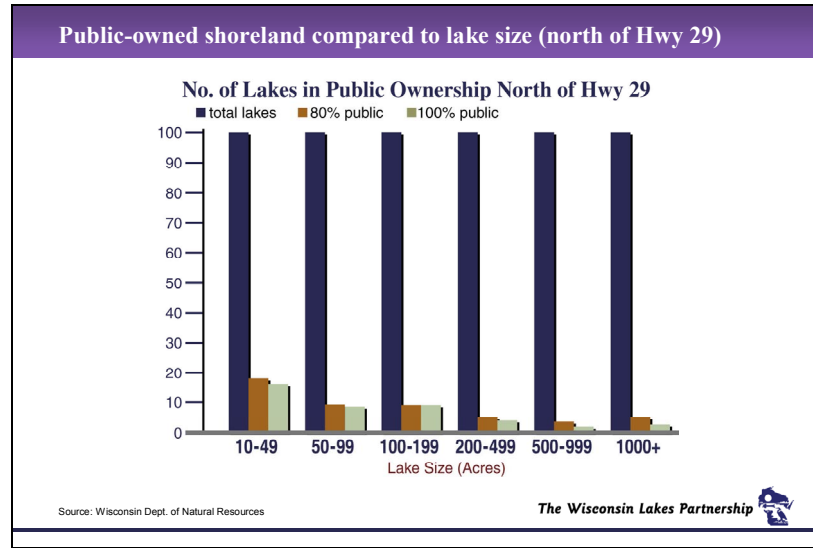
Slide 14



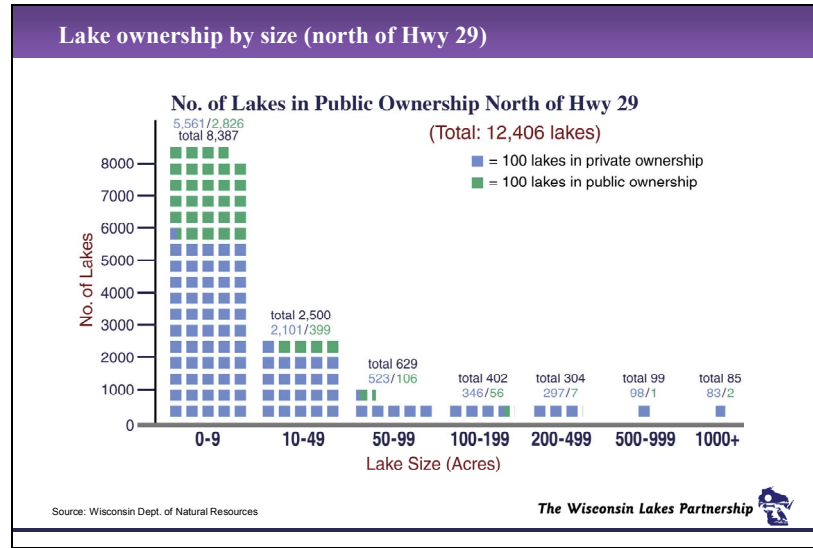
A strong national economy, growth in discretionary income and jobs that allow us to work away from our office have set in motion some exceptional circumstances. This trend has been building since World War II, but the impact has been particularly dramatic over the past three decades. So many people want to live away from cities and near the water that the demand is driving property prices sky-high. (Waupaca Chain of Lakes)

In some northern counties, property values have increased as much as 400% in the past five years. In Vilas County, shoreland selling for \$225 per foot of shoreline in 1990 is going for more than \$1500 today. In 1973, a 10 bedroom, 6 bath resort with 200 feet of frontage on the great Manitowish Chain in Vilas County had a \$45K asking price.

Slide 15

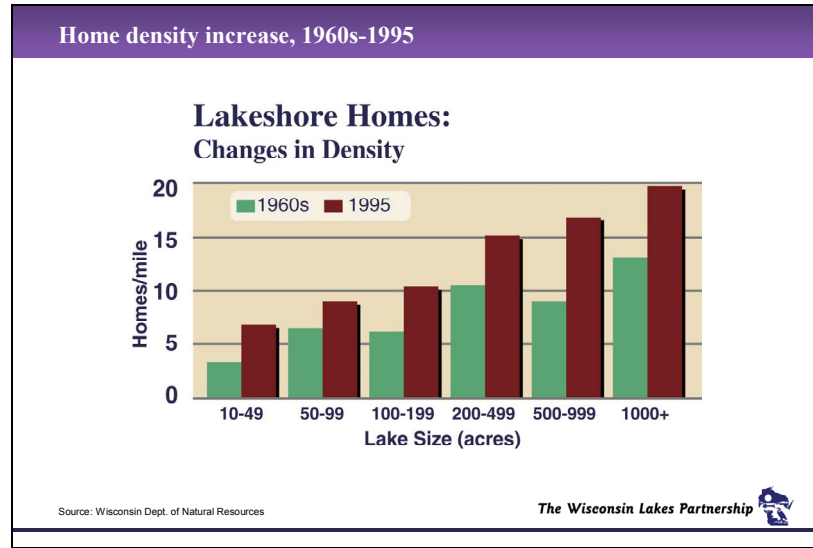


Slide 16



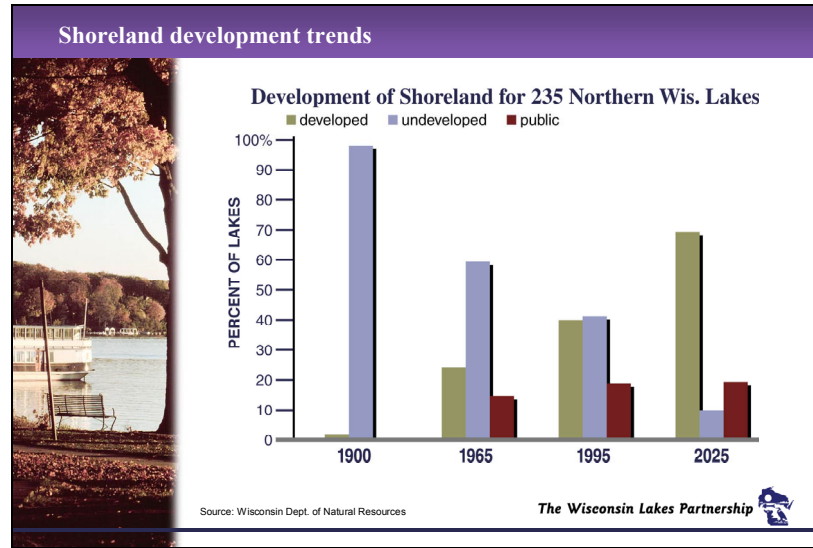
Wisconsin is blessed with over 15,000 lakes; 12,406 of them lie north of Highway 29. About 2/3 of these lakes (8,387 -- 67.6%) are very small, less than 10 acres in size. Even though they make up the bulk of Wisconsin's lakes, these small lakes have not been given much attention by the state; about 33% are in public ownership. Even these lakes are seeing pressure for development.

This chart shows the size, number and percent of total lakes north of Highway 29. Lakes south of highway 29 tend to be larger. The cost of frontage can be very high and often smaller homes are replaced with large ones. *Land around Grass Lake, a 39-acre lake in Forest County, is selling for \$5700 per foot of shoreline.* by WDNR



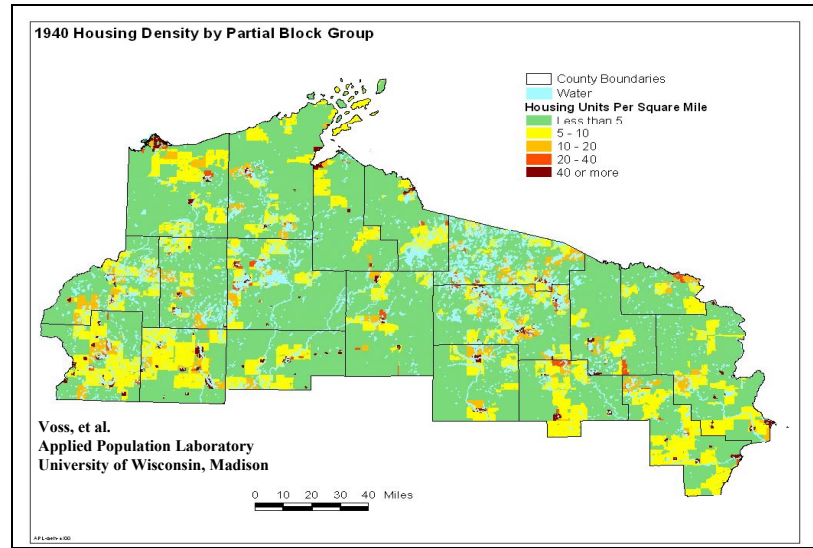
The green bars are from counts taken in 1960 and the maroon bars are from a 1995 survey. The greater the size of the lake, the greater the level of development. Although this graph doesn't show the number of homes per lake, a 500-1000-acre lake now has nine times the number of homes that it did in the 1960s. (WDNR)

Slide 18



The Wisconsin DNR conducted an aerial survey of 235 lakes in northern Wisconsin. They found that since 1965, two out of every three previously undeveloped lakes has had some level of development. Projecting these figures twenty years into the future, it appears that undeveloped lakes which are not in public ownership might be very rare. (WDNR)

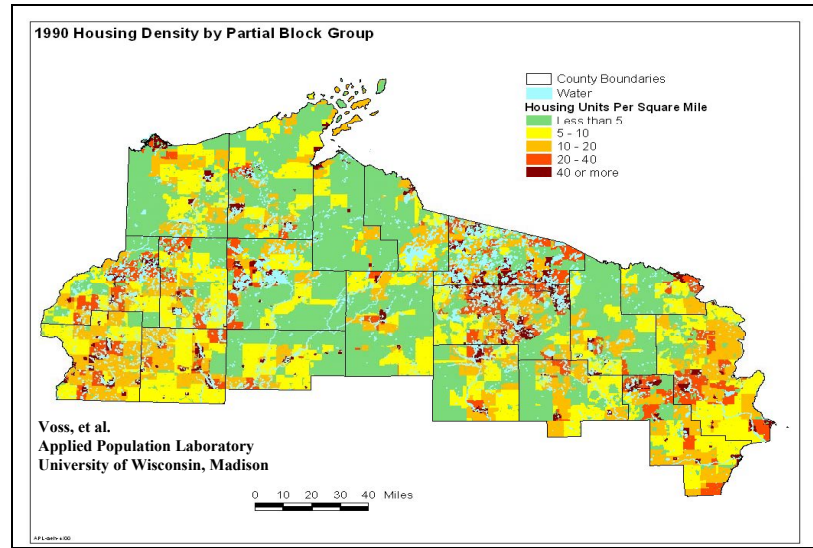
Slide 19



This slide shows housing unit densities projected backward to 1940.

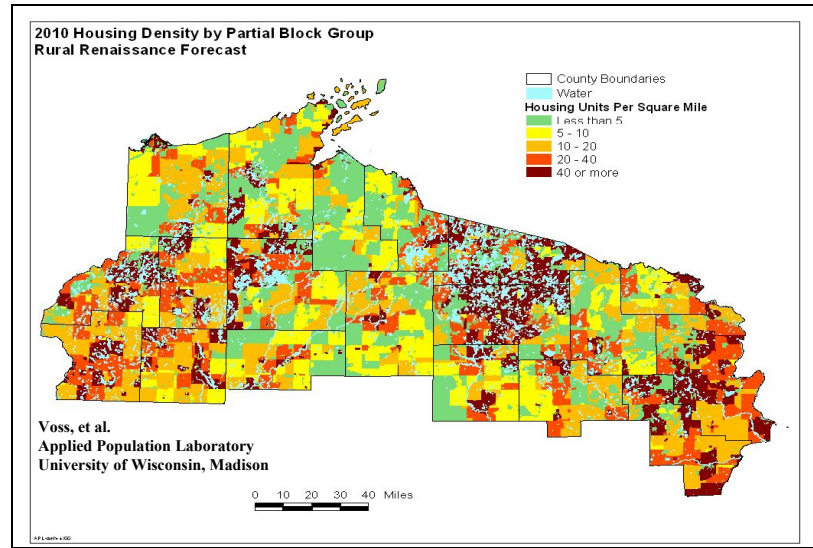
Most of the area is less than 5 units per square mile (green) with small portions of the map showing 5-10 housing units per square mile (yellow).

Slide 20



When we flip forward to 1990, you can see concentrations of housing unit growth: the orange and red shaded areas representing more than 20 housing units per square mile.

Slide 21



Flipping forward to 2010, housing density increases in these three areas of concentration. The places where housing unit density remains low are dominated by public land: national, state, or county forests. This gives a vivid picture of the likely hotspots of development in northern Wisconsin.

Slide 22



Slide 23



The problem is we aren't making any more lakes or rivers, but we are making more people! The spiraling demand to own lake front property and to use our state waters is at an all-time high. The number of people on our waters is increasing, and when we go there we spend much more time.

Slide 24



The water's edge is a complicated and busy place.

Slide 25



What we want is a relaxing atmosphere, a place to recreate and observe natural beauty. What we get may be something less. As more and more of us look for a quality experience on and near the water our sheer numbers are diminishing that experience.

Slide 26

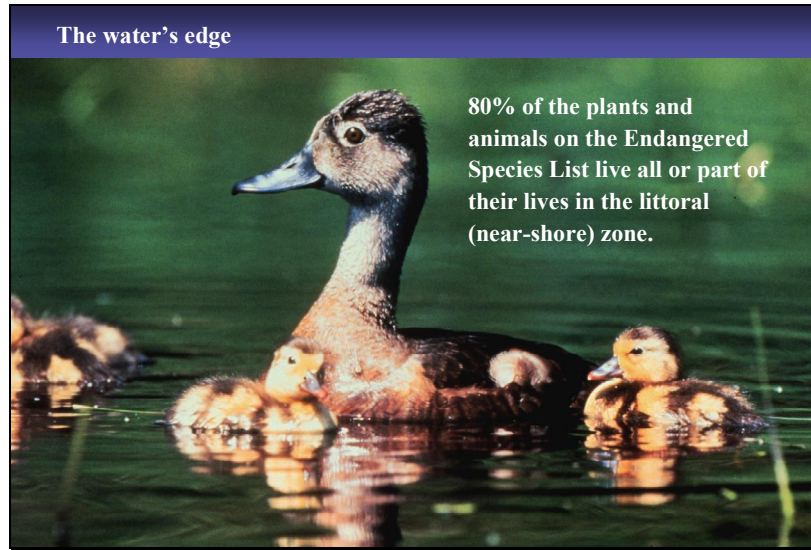


Our ability to buy or build our dream home near the water brings with it a collection of predicaments. As with most good things, there are tradeoffs to consider.

Slide 27



As more and more of us move near the water, we change the shore area's natural features by building structures and removing the natural vegetation. We slowly but surely change the very nature of the lake ecosystem. Small seasonal cabins are being converted to large year-round homes, increasing their impact to the shores and lake.

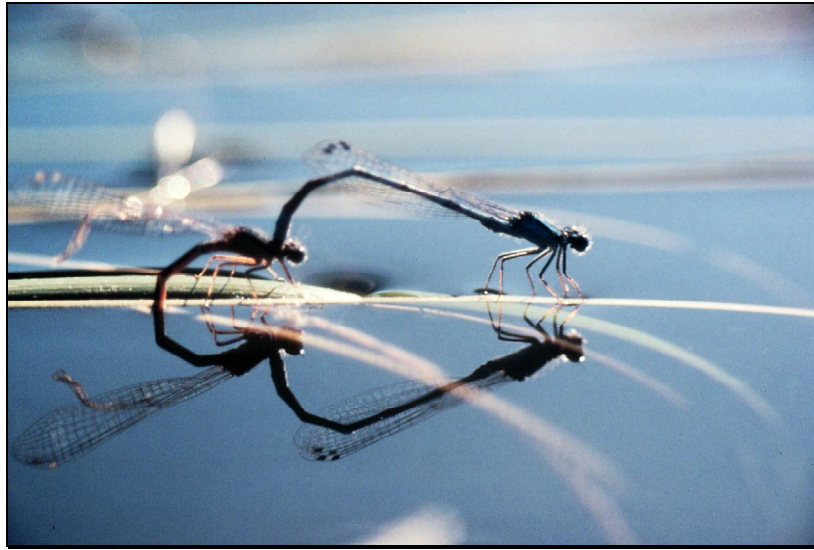


80% of the plants and animals on the Endangered Species List live all or part of their lives in the littoral (near-shore) zone.

A continuous ribbon of life circles lakes and borders rivers in their natural state. No one project will bring a riparian ecosystem to its knees, but the cumulative impacts of all our projects cut that ribbon of life. If the ribbon of life is cut enough, it will cease to exist.

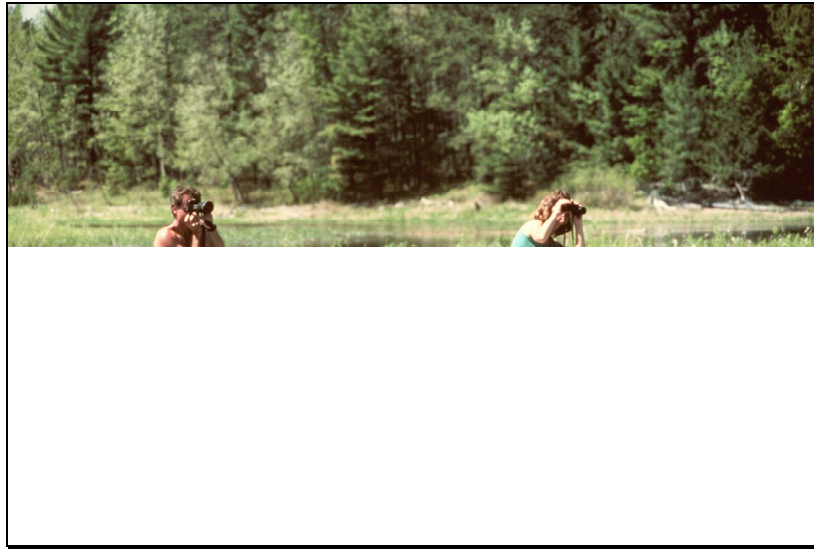
Eighty percent of the plants and animals on the Endangered Species List live all or part of their life in the littoral (or near-shore) zone. (WDNR)

Slide 29



The lake margins are places where many creatures and plants must live to survive. It is a place where many people choose to live. Studies show that there can be as much as 500% more species diversity in the area near the water's edge compared to adjoining uplands. That means more types of birds, mammals, insects, plants and other types of wildlife live in this bountiful and fragile area than in uplands. (Sande Verry, USFS)

Slide 30



Over time, we participate in activities that can eliminate or degrade these centuries-old aquatic systems. When that happens, the very reasons that bring us here start to disappear, and people who use our lakes feel that their rights are being interfered with and their activities frustrated.

Slide 31



Development is not a bad thing; as long as there are humans we will build homes. It is how much we build, where we build and how we build that will determine if we protect or harm our lakes. Improperly done, construction can have a dramatic negative impact on a lake's water quality and habitat.



NR115 – Shoreland zoning



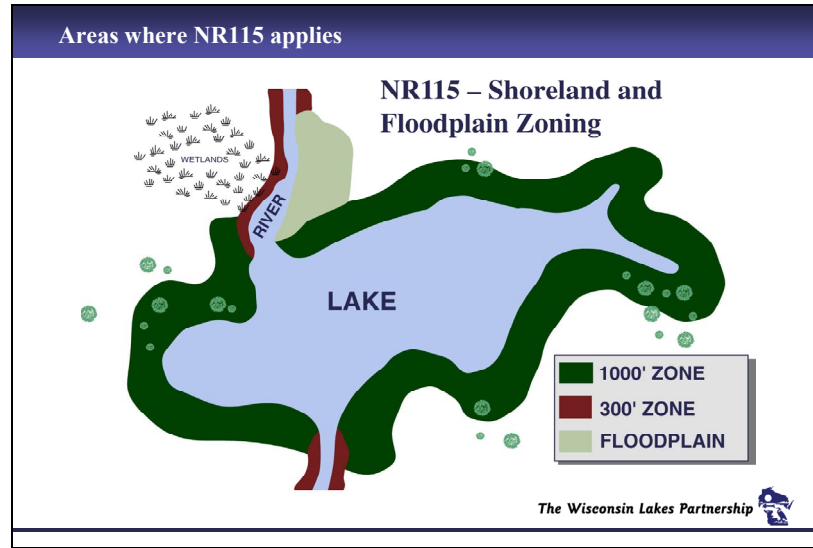
- **Control the density of development on the water's edge.**
- **Create or keep vegetation buffers near the water's edge.**

To preserve and protect healthy lake ecosystems and limit frustrations and disappointment on Wisconsin's waters.

The Wisconsin Lakes Partnership 

Folks in our state have long been aware of the need to protect the habitat, natural beauty and recreational opportunities that Wisconsin waters provide. To accomplish this, the state legislature directed the Department of Natural Resources to adopt rules for shoreland development in the mid-1960s (NR115). Wetland protection rules were written a decade later. The rules are administered by local units of government as shoreland zoning ordinances. The regulations accomplish this by:

- controlling the density of development
- controlling land-disturbing activities in order to avoid erosion and sedimentation
- providing a buffer of undisturbed vegetation between development and the water's edge



This map shows the shorelands where the rules apply: lands within 1,000 feet of the ordinary high-water mark (OHWM) of a navigable lake, pond or flowage, and land that is within 300 feet of the (OHWM) of a navigable river or stream, or from the landward edge of a floodplain if that is greater. General shoreland zoning ordinances (lot size, setbacks, etc.) apply only in the unincorporated areas of counties, but wetland protection features apply in all shorelands throughout the state.

Shoreland zoning



A partnership between state and local government.

- Counties can adopt state-wide rules (NR115) or develop their own if they are more protective than state standards.


The Wisconsin Lakes Partnership 

Wisconsin's Shoreland Management Program is a partnership between lakes and local government. It is a program that continues to play a major role in determining the look of the landscape of our state. State rules provide only basic resource protection, but counties can custom tailor shoreline ordinances to their waters. Counties can adopt the statewide rules (NR115) or develop their own if they are more protective than state rules. The decision to grant or deny a variance for special exceptions or conditional uses is made by county boards of adjustment. The state oversees local administration and enforcement of these standards.

Shoreland zoning NR 115 - the rules

- **Affected area:** shorelines adjacent to navigable lakes, ponds, flowages, rivers and streams. 1,000 ft. from lakes; 300 ft. from rivers; not in incorporated cities.
- **Lot size:** septic tank – 100 ft. water frontage & 20,000 sq. ft.; sewer – 65 ft. water frontage & 10,000 sq. ft.
- **Buffer:** no clear cutting from the ordinary highwater mark (OHWM) to 35 ft. inland.
- **Setback:** 75 ft. from OHWM.
- **Grandfathered:** allows house built before the rules to remain, but limits expansion.

The Wisconsin Lakes Partnership



Let's take a look at some of the rules (remember that local regulations may be more restrictive).

Lot Size-The type of waste disposal (sanitary) system serving the lot will affect your lot size requirement. Sewered lots must have at least 65 feet wide of water frontage with 10,000 square feet of area. Lots with on-site waste disposal systems must have 100 feet of water frontage and 20,000 square feet of area. Land disturbing activities -- filling, grading and similar activities - are regulated to prevent erosion and movement of soil and nutrients into nearby waters.

Buffer - In the strip of land from the ordinary high water mark (OHWM) extending 35 feet inland, no more than one 30-foot-wide corridor in each 100 feet of shoreline may be clear cut of trees and shrubbery.

Set Backs - All buildings and structures must be set back 75 feet from the OHWM. There are exceptions: piers, boat hoists, and boathouses. If construction that occurred before the rules were in place leads to an existing pattern of house setbacks closer than 75 feet, counties may allow *setback averaging*, even if it breaks rules.

Grandfathered Structures - This part of the rule allows homes that were built before the rules and that don't comply with the standards to serve out their useful life. The county may prohibit altering, repairing or adding on to these homes if the cost over the life of the home exceeds one half of its assessed value. The idea is to phase out these older houses over time.

Slide 37



The growing interest in land use and demand for waterfront property have been a catalyst for review of the effectiveness of NR115. Most studies suggest that under ideal site conditions current standards may only meet minimums for controlling runoff of sediments and nutrients. The 35-foot buffer, if it contains undisturbed vegetation, will provide only minimal habitat for some species.

(T Berthal, J. Barrett, S. Jones, DNR Publ-WT-505-97 & Publ-WT-508-97)

Slide 38



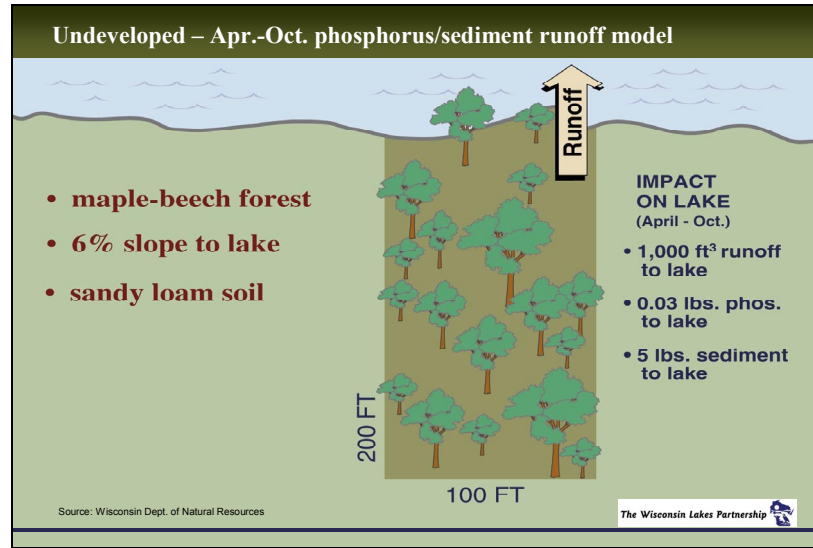
The rules may be falling short. We know from a wide variety of studies that over-development of the shoreland and over use of lake areas can result in lower water quality and reduced habitat for fish and wildlife. Poorly planned development can also mean loss of natural beauty and a lower quality of recreational experience -- in other words, diminishing the very things people want most from lakes.

Slide 39



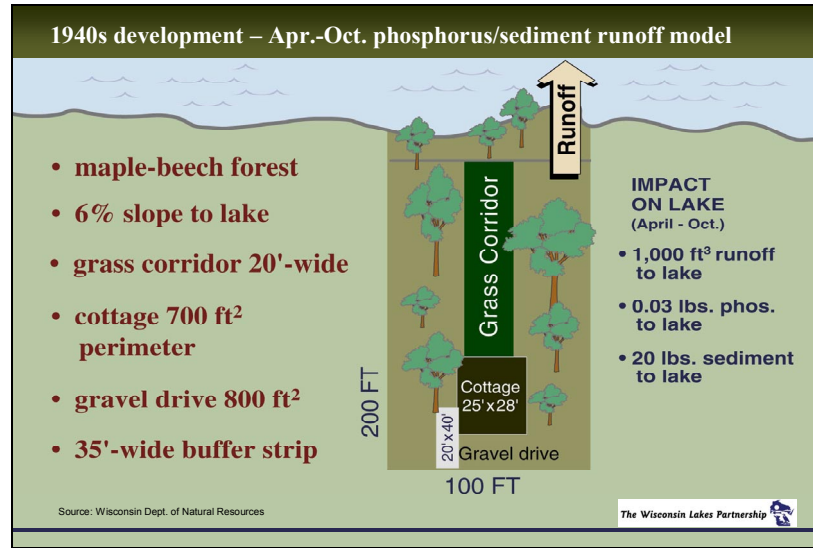
In the 1940s and 1950s, lake cabins were small in size and seasonal in their use.

Slide 40



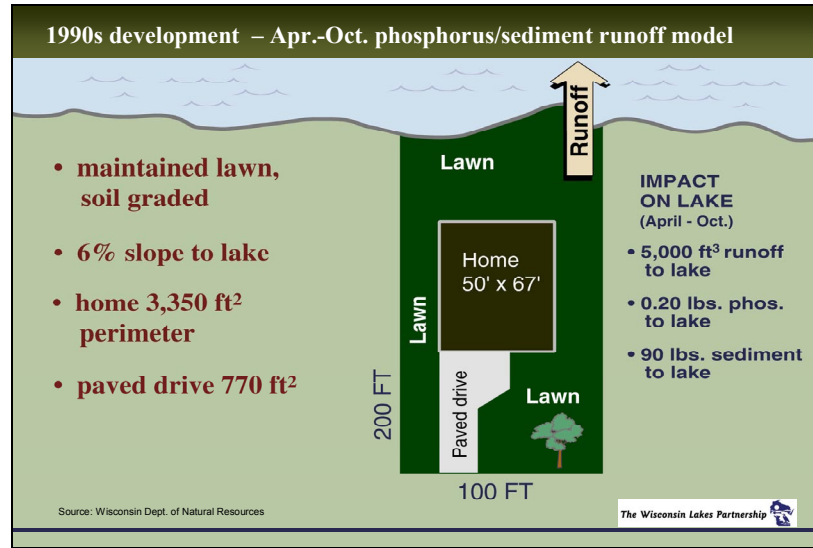
The next four images show a computer modeling of a lot with different levels of development. The first is a lot with its vegetation intact. Note the amount of phosphorus that enters the lake.

Slide 41

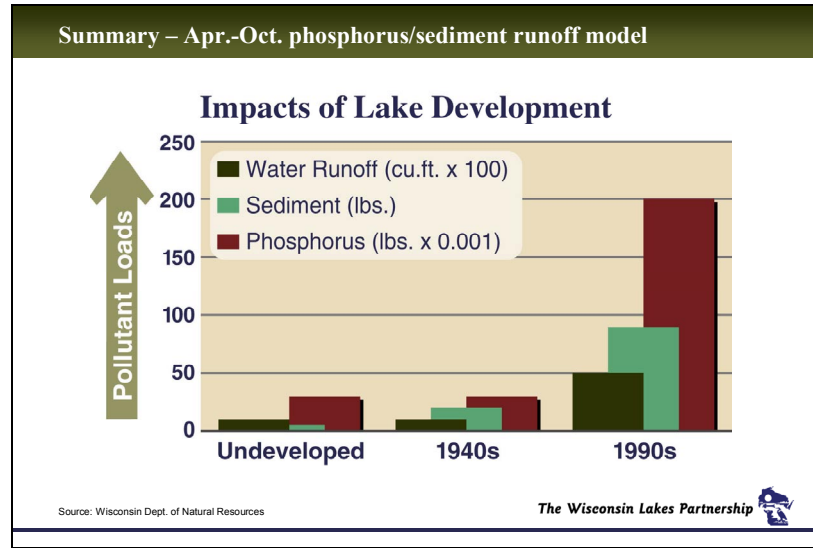


Here is the same lot with a 1940s type cabin and a 20-foot wide grassy path to the lake. There is a 35-foot buffer of vegetation and much of the lot is still wooded. The grass corridor is a typical lawn turf. The model is based on vegetation after it has recovered from construction.

Slide 42



Here is the same lot with a 1990s type house, 50X67 feet: the 35-foot buffer of vegetation is gone, there is more impervious area and most of the trees are gone. Again the lawn is a typical grass turf. Note the amount of phosphorous that washes off the land and into the lake. Again, the model is based on vegetation after it has recovered from construction.



This image summarizes the runoff of water, sediments and phosphorus at the three levels of development. When folks remove the natural vegetation to build a home and establish a lawn, the amount of phosphorus and sediments that can be carried into the lake by rains greatly increases.

Change in runoff, compared to undeveloped lot:

1940s -- runoff, no change
 sediments, 4X
 Phosphorus, no change

1990s -- runoff, 5X
 sediments, 18X
 phosphorus 7X

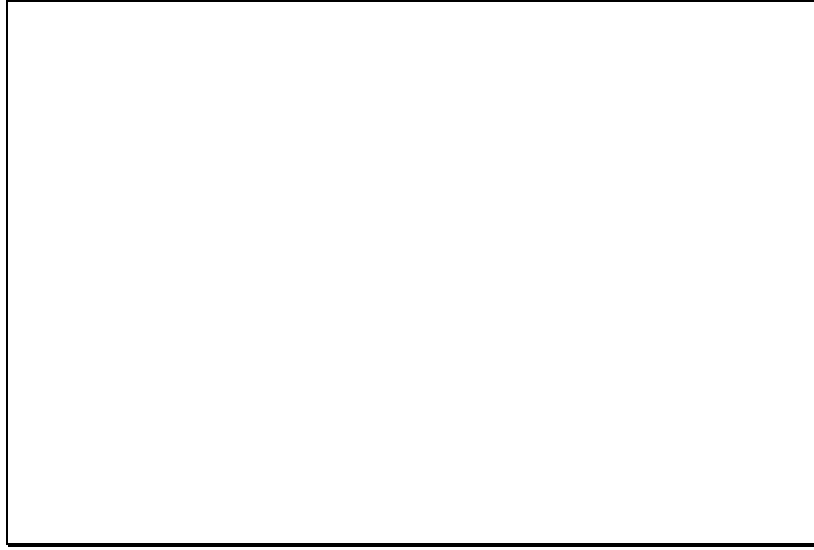
These results do not include runoff of pollutants during the construction period. Using sediment barriers during construction can be a great help in limiting the movement of sediments into the lake. More research on how vegetation limits sediment and nutrients from entering the water is planned.

Slide 44



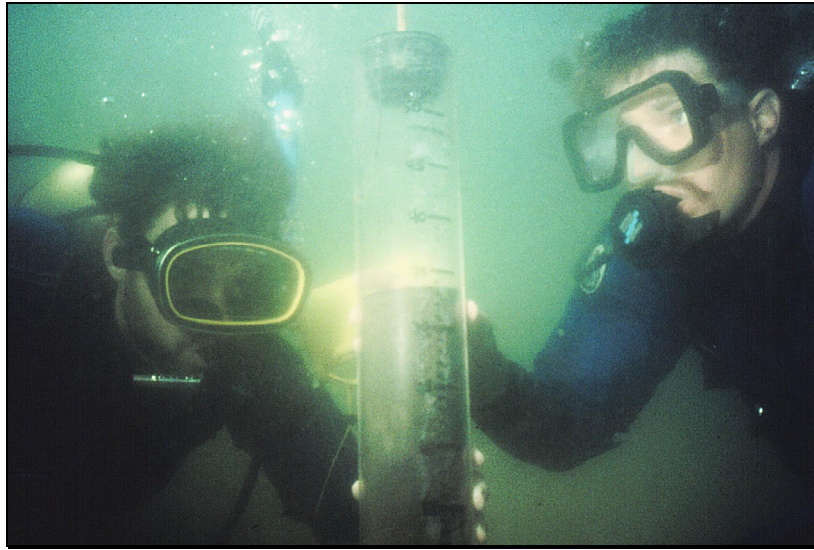
Larger homes used year-round have increased the impact on our lakes. They can lead to increased nutrients like phosphorus entering the water. Phosphorus and other nutrients can cause increased plant growth and deteriorate water quality.

Slide 45



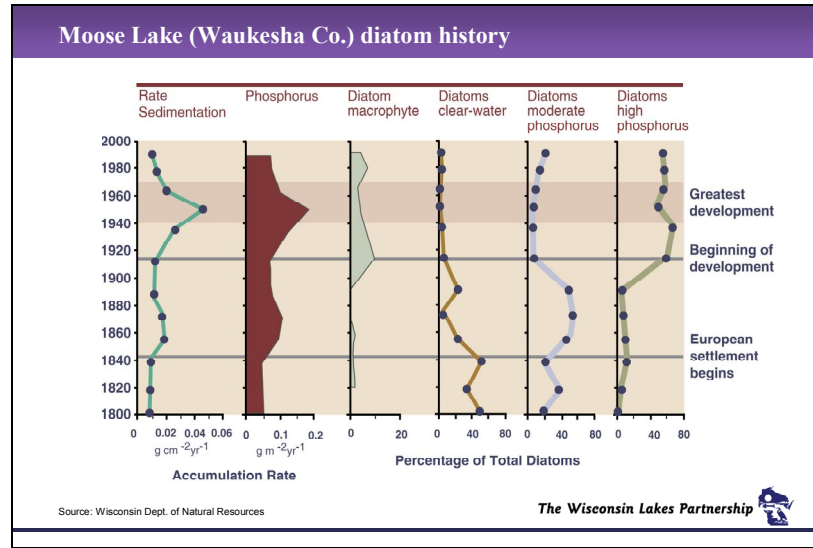
Every project, even small ones, has an influence on the lake and the land. Repeated up and down the shore, they add up to huge impacts. This lake, called “Lake 227,” is located in Ontario, Canada. It was split in half by scientists. One half had phosphorus added, the other not. Note the “pea soup” condition and algae bloom on the side where phosphorus was added. Which side would you want to swim in?

Slide 46



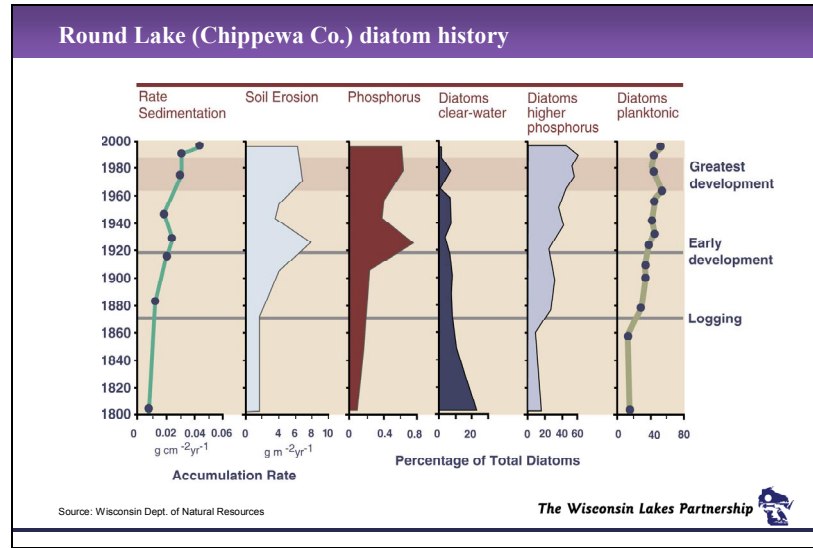
Because sediment naturally builds up on a lake bottom over time, an accurate record of environmental change can be found in the lake's sediment layers. Divers drive a plastic tube into bottom sediments and bring a core up to be analyzed in a science called paleolimnology. Researchers have found that certain tiny alga called diatoms live under very narrow environmental conditions. If the water quality is poor, all types of diatoms cannot exist there, so diatoms are good indicators of past water quality.

Slide 47



Here is the historical record of diatoms from a sediment core collected from Moose Lake in Waukesha County in south eastern Wisconsin. Moose Lake is a hard water, seepage lake near Oconomowoc. This lake underwent intensive development from 1950-1970. The shore has steep slopes and well-manicured lawns. It appears that the greatest impact on the water quality occurred during the construction phase. The greatest sedimentation rate and phosphorus input occurred then. The diatom community is more sensitive, responding to increased phosphorus during the early shoreland development phase. Water quality improves some following construction but the diatom community in this lake is still dominated by phosphorus loving taxa. In nearby Silver Lake, which has less intensive development and flatter topography, the lake's water quality has improved more than Moose Lake.

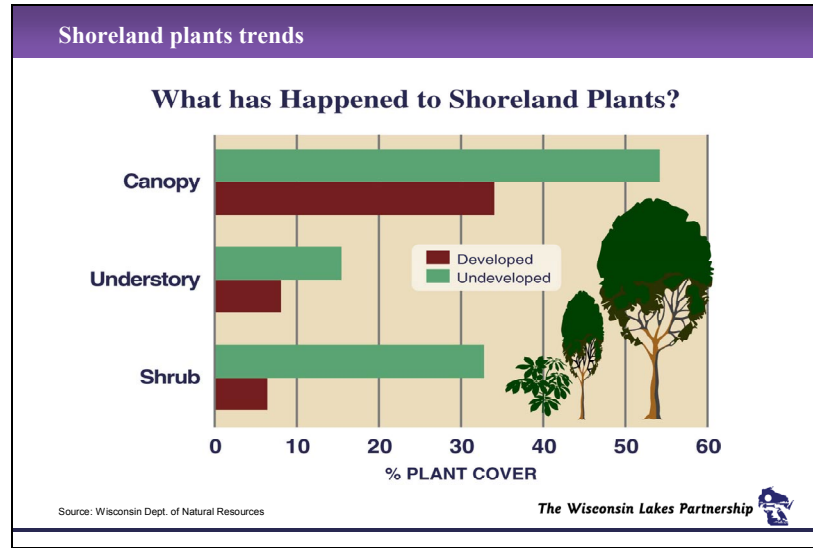
Slide 48



This is another core from Round Lake in Chippewa County in northwestern Wisconsin. Round Lake is a soft water, drainage lake. As with Moose Lake, the diatom community responded early in the development phase. Although some slight improvement in water quality is indicated by the diatoms, anoxia in the hypolimnion (lack of oxygen in deep waters of the lake) has gotten worse in the last decade. The increased precipitation of iron and manganese as a result of decreased hypolimnetic dissolved oxygen explains the elevated sedimentation rate. In general, softwater lakes seem to be more sensitive to watershed disturbances, including shoreland development.

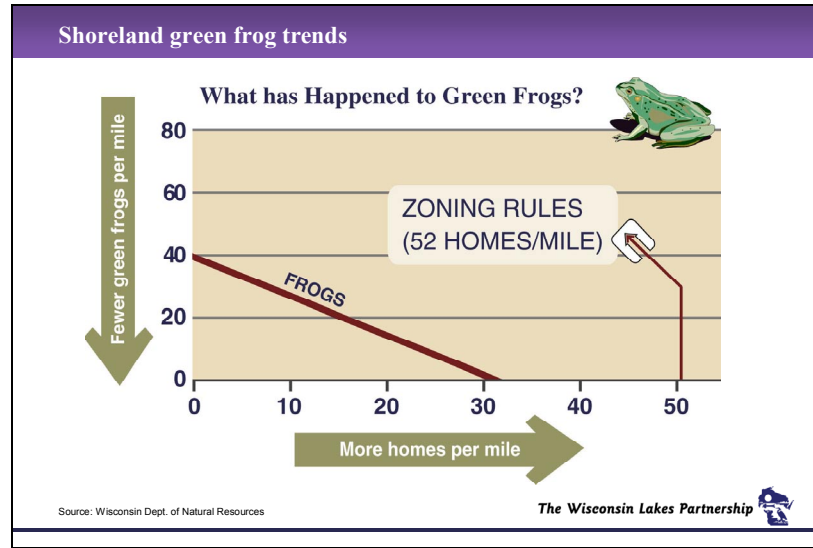
As a sidelight: In all of Paul Garrison's cores from around the state he noticed that an expansion of the macrophyte community occurs with the early development of the watershed. For example, in Moose Lake this occurred around 1915.

(Paul Garrison, Journal of Paleolimnology, Use of paleolimnology to document the effect of lake shoreland development on water quality)

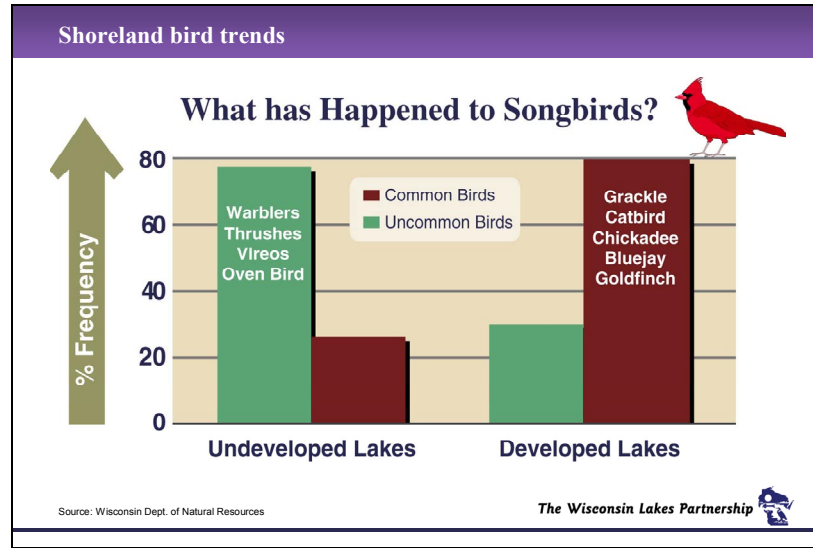


During the summer of 1997 biologists measured the vegetation at 146 sites on undeveloped and developed lakes. All three levels of vegetation were reduced in developed sites. Note how the understory trees and native shrubs were reduced to very low levels along developed shorelines.

Slide 50



Development can bring with it dramatic change in shoreland plants. Biologists have set out to measure changes in the number and kind of wildlife species. They found fewer loons, fewer green frogs, and changes in the songbirds populations. Green frogs are often found along shorelands. Males establish breeding territories within two feet of the lake's edge. Biologists conducted surveys of toads and frogs on 24 undeveloped lakes in Vilas and Oneida Counties. Their results show that as homes become more dense green frog numbers decline.



Surveys show that there are just as many birds on developed lakeshores, but they are different kinds, compared to undeveloped shorelands. The green bars show the frequency of uncommon birds like warblers and vireos. These songbirds were primarily found along undeveloped lakes. Many of these less common birds winter in the tropics, and some of them are on the list of “species of special concern” because of declining numbers. Common suburban-style birds like chickadees, blue jays, grackles and goldfinches were more abundant on developed lakes. Some believe that continued lakeshore habitat changes, even following current zoning clear-cut rules, will place less-common songbirds at greater risk.

Slide 52



Lawn care is a 40-billion-dollar-a-year business in this country. Often landowners bring city notions of landscaping to the lake shore and remove native vegetation on their land and replace it with lawn. Lawn fertilizers can be a significant source of phosphorus to a lake. For example, studies found that lawns in residential and industrial areas contribute 14-44% respectively of the phosphorus in storm water runoff in Madison.

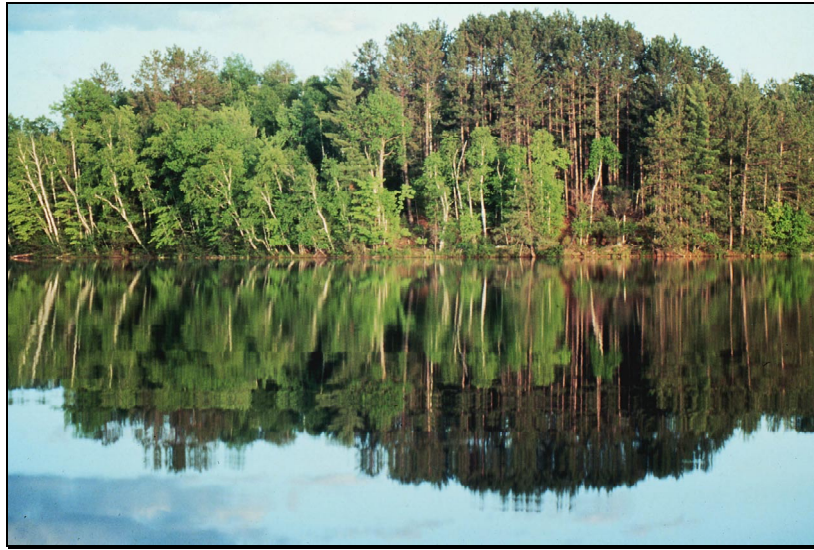
(Bannerman, Owens, Dodds, Huges 1992 Report for USEPA Grant # C9995007-01)

Lake development - key concepts

- All lakes experience a decline in water quality over time, normally over thousands of years when lakes are in a natural state.
- Land clearing and building development can accelerate the rate of decline in water quality to a few decades.
- A lake's water quality is directly affected by the land surrounding it -- the **watershed**.
- Natural ground cover and uncompacted soils allow water to filter into the ground and keep soil and pollutants from washing into lakes.

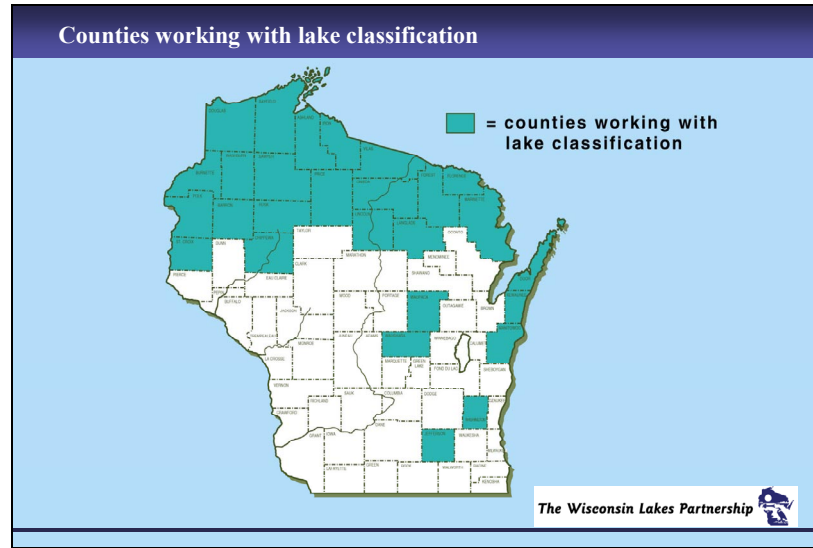
BOTTOM LINE: MINIMAL LAND DISTURBANCE = BETTER WATER QUALITY & BETTER HABITAT.

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Each lake is distinct; they come in all sizes and shapes and have varying characteristics. Like people, each one reacts differently to certain treatments. So how do we ensure the health of 15,000 distinctive lakes? One way is with Lake Classification.

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An old idea that has received new attention at the local level is lake classification. A growing number of counties have chosen to use this technique to review and upgrade their shoreland protection strategies. As opposed to a “top-down” statewide approach to lake classification, each county can choose to develop its own lake classification system with state guidance and grants provided by the Wisconsin Lakes Partnership. *The state will pay a 75% share, up to \$50,000.*

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We have learned that the slow but insidious influence of many small actions can devastate the ecological health of our shores and waters. But there is good news! The cumulative impact of many small actions can also restore and preserve our waters for generations to come. In fact... it is the only way it will happen.

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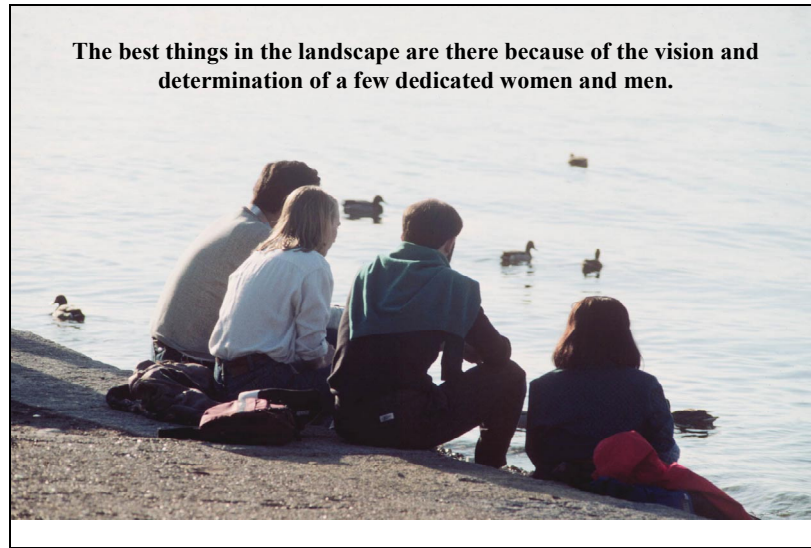
Landowners on our water's edge have a great responsibility for and also a great investment in a healthy future for Wisconsin lakes and rivers.

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Every piece of property on our waters is important. Working together we can preserve our legacy by protecting fragile shoreland areas.

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The best things in the landscape are there because of the vision and determination of a few dedicated women and men.

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